MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

MAX2053 – 3D SIMULATION

(All sections / Groups)

9 MARCH 2020
9.00 a.m – 11.00 a.m
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 16 pages of simulated questions. Read them carefully.

2. This exam paper consists of TWO parts:

Part One: Multiple Choices	Answer **ALL 30** questions
Part Two: Essay Questions	Answer **TWO** out of THREE

2. Simulate all your answers in the Answer Booklet. May the force be with you.

PART ONE: MULTIPLE CHOICE QUESTIONS

Answer ALL Questions in the Multiple Choice Answer Sheet.

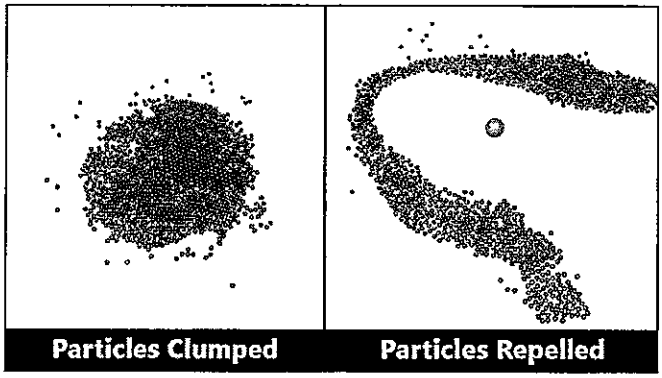


Image 01

1. *Image 01* shows a group of particles clumping together. However, the particles are repelled once a new particle is introduced into the scene. What would you need to do to get the particles to repel similar to the image above?

   A. Increase collision's Width Scale
   B. Turn on Force Field Generation
   C. Increase Dynamics Weight of the particles
   D. Turn on Goal Weights value

2. Which attribute below controls a dynamic field's area of influence?

   I. Attenuation value
   II. Volume shapes
   III. Min & Max Distance
   IV. Magnitude

   A. I, II and III
   B. I, II and IV
   C. II, III and IV
   D. All of the above

3. How do you cache an *nCloth* simulation?

   A. Go to *nCloth* > Create New *nCache* > *nCloth* Geometry
   B. Go to Edit > Keys > Bake Simulation
   C. Go to Modify > Attributes > Bake Simulation
   D. Go to *nCache* > Create New Cache > *nObject*

Continues .....

4. Which statement below regarding Paint Effects is **TRUE**?

   A. The Display Density attribute only adjusts the stroke's viewport density
   B. Paint Effects animation is controlled by dynamics simulation.
   C. All objects must be set *'Live'* before Paint Effects can be applied
   D. Paint Effects cannot be converted into polygon.

5. Which particle render types listed below is **NOT** a software based particle?

   A. Tubes
   B. Sprites
   C. Clouds
   D. Blobby Surface

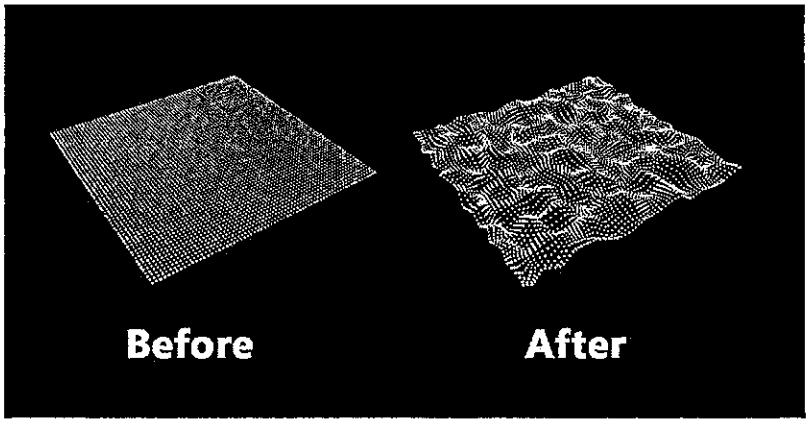


Image 02

6. *Image 02* shows a particle grid before and after a field is attached to the particles. Which combination of dynamic field and *ParticleShape* settings that would able to achieve the result shown above?

   A. Attaching Turbulence field with small magnitude value
   B. Attaching Turbulence field with low conserve value
   C. Attaching Turbulence and Drag field together with the particle
   D. Attaching Turbulence field and increase Radius randomization

Continues .....

7. George created a cannonball flying through the air. He used Maya rigid body to animate the cannonball. He wants the ball to drop down after 30 seconds of flight. How can he achieve this using the rigid body dynamic system?

   A. Assign a Newton field and keyframe its strength after 30 seconds
   B. Animate the Translate-Y after 30 seconds
   C. Assign a Drag field and keyframe its strength after 30 seconds
   D. Animate the Conserve value to decrease after 30 seconds

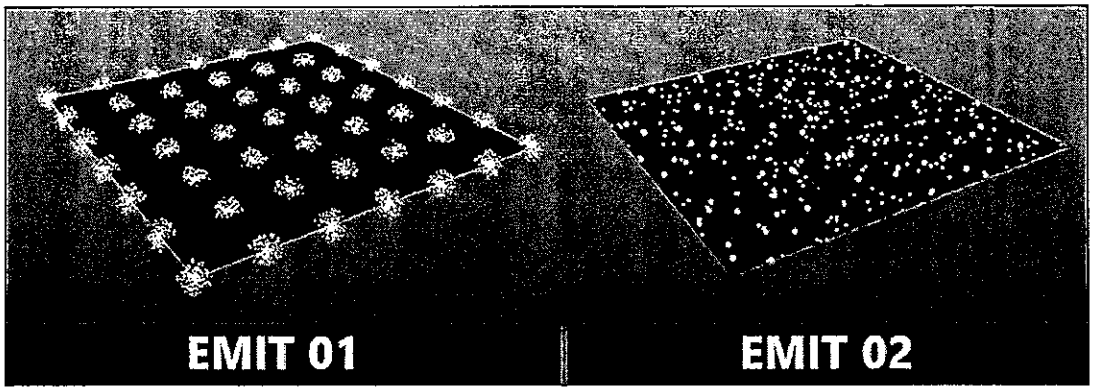


Image 03

8. *Image 03* above shows an attempt to emit particles from a plane. By default, you would get a result similar to *Emit 01*. How would you achieve a particle emission of *Emit 02* instead?

   A. Change the particle type from points to multi-points
   B. Increase the Spread attribute of the emitter to maximum
   C. Change emission type to surface emission
   D. Increase the particle emission rate to cover the whole object

9. *nDynamics* is a newer particle system used in Maya. What does '*n*' stands for in *nDynamics*?

   A. Noire
   B. Next-Gen
   C. Nucleus
   D. Natural

More questions .....

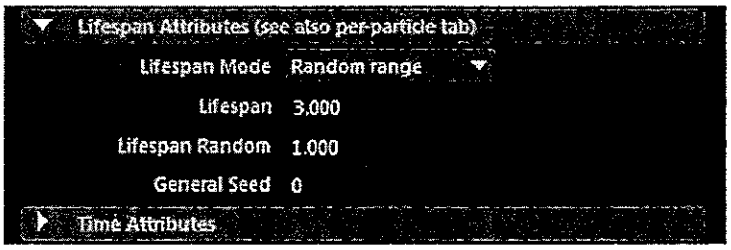


Image 04

10. Michael created a new *ParticleShape* with lifespan settings shown above for a PAL TV production. Based on these settings, which statements below are **TRUE**?

I. Increasing '*General Seed*' will vary *Lifespan's* pattern only
II. All particles has a lifespan life of 3 frames
III. *Lifespan Random* value adds additional frames to the *Lifespan* value
IV. No particles will die before frame 50

A. I and II
B. II and III
C. III and IV
D. I and IV

Image 05

11. The character above was designed to have jiggling secondary motion on his body. Which dynamics simulation systems would you use to create the jiggling effect?

A. Rigid Body Simulation with Springs
B. Soft Body Simulation with Goals
C. Soft Body Simulation with Goals with Springs
D. Rigid Body Simulation with Goals

More questions .....

12. Which types of NURBS curves below are acceptable for *nDynamic* Curve simulations?

I. CV NURBS curve
II. EP NURBS curve
III. Open NURBS curve
IV. Closed NURBS curve

A. I and II only
B. II and IV only
C. All of the above
D. None of the above

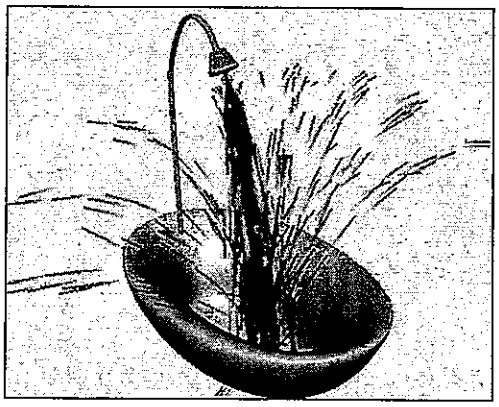


Image 06

13. *Image 06* above shows a simple particle collision setup using MAYA legacy dynamic system. The particles are bouncing off the collision surface and spill outside of the bathtub. Which attribute is responsible to minimize the bounce height of the particles?

A. Collision Strength attribute
B. Dynamic Friction attribute
C. Damping attribute
D. Resilience attribute

14. Kimbo wants to attach a new fire effect with an existing turbulence field. Which MAYA editor would he use to complete the task?

A. Dynamics Relationship Editor
B. Dynamics Component Editor
C. Dynamics Hypergraph Editor
D. Attributes Connection Editor

Still more questions .....

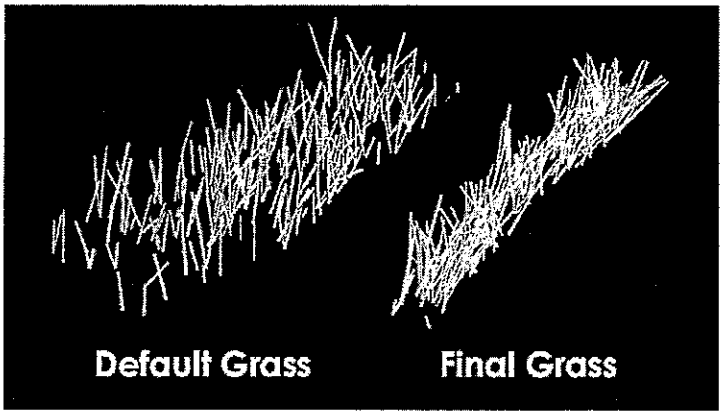


Image 07

15. *Image 07* above shows an example of a *Paint Effects grass stroke*. How would you modify the grass stroke attributes to achieve a result similar to the Final Grass above?

    A. Minimize the brush width
    B. Minimize the global width
    C. Increase the sample density and scale the stroke size
    D. Increase the density per step attribute

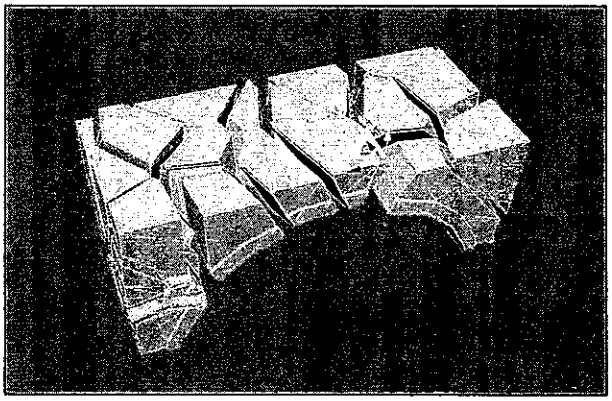


Image08

16. The image above was created using a tool used to create debris pieces from an existing polygon object. What tool would you need to execute this effect?

    A. Solid Shatter Tool
    B. Crack Shatter Tool
    C. Surface Shatter Tool
    D. Poly Separate Tool

Keep going .....

Image 09

17. Suzy created a car crash scene where two vehicles smashed into each other. She decides to use *nCloth* dynamics to create the dented metal effects. What does she need to do to ensure that the *nCloth* would deform like a metal rather than a cloth fabric?

I. Decrease the conserve value
II. Increase the Bend Resistance
III. Decrease the Restitution Angle
IV. Increase the damping value

A. I and II
B. I and IV
C. II and III
D. III and IV

18. Lucy is trying to simulate rocks to fall onto a house using *Bullet* in MAYA. However, selecting each rock to tweak her simulation is hindering her speed and productivity. What is the **BEST** solution for her to improve her *Bullet* workflow?

A. Create a set driven key on a single rock to automate selection for all rocks
B. Parent all the rock into one group and apply Bullet simulation onto the group
C. Create multiple selection handles to group the rocks together
D. Create a Rigid Sets to control all rock simulation attributes

A bit more .....

19. Which statement below is **TRUE** regarding MAYA *Ocean* effects?

A. It creates full realistic 3D surface water deformation and collision
B. The ocean's movement is simulated using Bifrost dynamic calculations
C. It can interact with MAYA fields and collision object
D. It is a flat NURBS surface with an *Ocean* shader assigned to the object

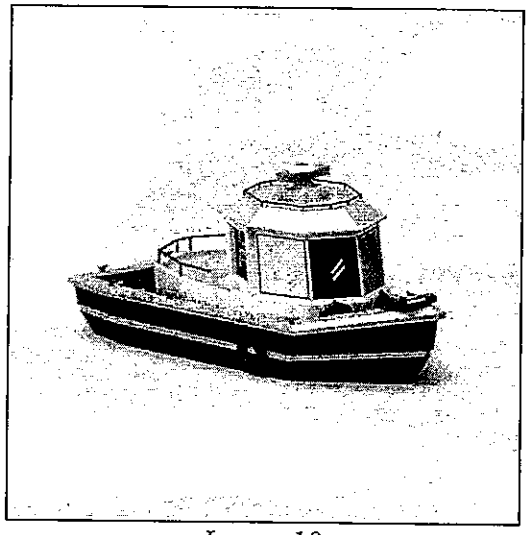


Image 10

20. *Image 10* above is a 3D boat moving through Maya *Pond*. Which *Pond* tool can you use to create this effect effectively?

A. Create Boat > Make Boat
B. Create Boat > Make Motor Boat
C. Ocean > Constraint To Surface
D. Pond > Make Collide

21. Which file naming structure below is most suitable for use as an animated texture for sprite particles?

A. 001.sprite.png
B. sprite-001.png
C. sprite.png.001
D. sprite.001.png

Really? There are more questions? .....

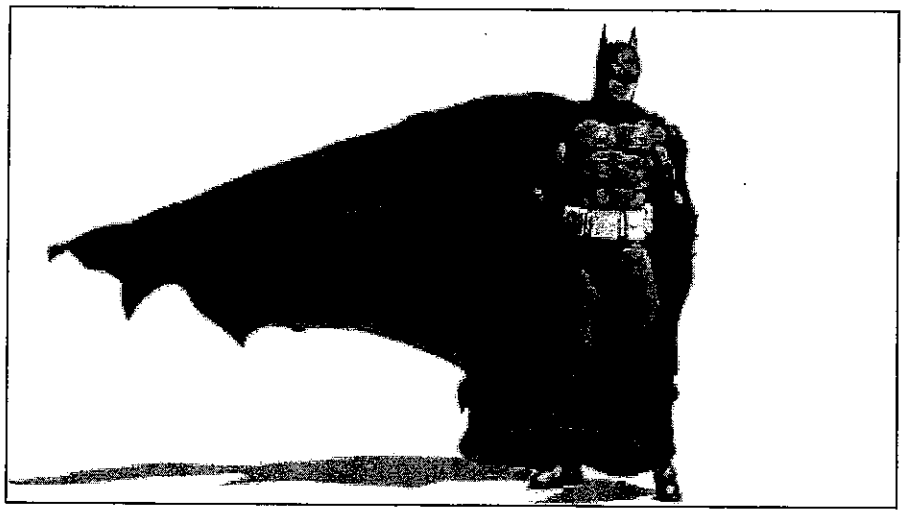


Image 11

22. *Image 11* above shows an *n*Cloth 3D cape constrained to Batman. Which *n*Cloth constraint would be best to use to achieve this effect?

    A. Component Constraint
    B. Transform Constraint
    C. Point to Surface Constraint
    D. Hinge Constraint

23. *n*Cloth can sometime cause the cloth to bunch or clump up during simulation. This is due to crossovers of points that happened during the cloth simulation. What can you do to minimise the crossovers and ensure a cleaner, better *n*Cloth simulation results?

    I. Increase the Max Self Collision Iteration value
    II. Increase Substep
    III. Minimise the Push Out Value
    IV. Turn on the Self Trapped Check option

    A. I, II and III
    B. I, II and IV
    C. I, III and IV
    D. II, III and IV

When will this end? .....

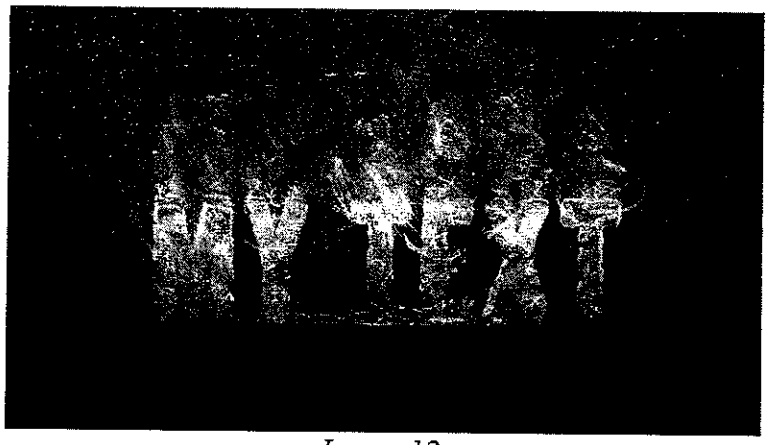


Image 12

24. *Image 12* is a smoky text effect dispersing away. How would you create this effect using the *Fluid* dynamics system?

    A. Create a 3D text and assign it to emit fluid particle with increased Turbulence attribute
    B. Create a 3D text emitting fluid particles with 'MY TEXT' texture map applied to its Transparency attribute
    C. Apply a texture map of 'MY TEXT' to the Density attribute and increase the Swirl attribute
    D. Apply a texture map of 'MY TEXT' to the 2D Fluid container's emitter attribute and increase the Swirl attribute

25. Enlarging a fluid container would cause the fluid content to look less dense. How would you increase the density of the fluid container?

    A. Increase the Fluid Resolution
    B. Increase the Voxel Resolution
    C. Increase the Threshold Resolution
    D. Increase the Viscosity Resolution

Not yet. A few more left .....

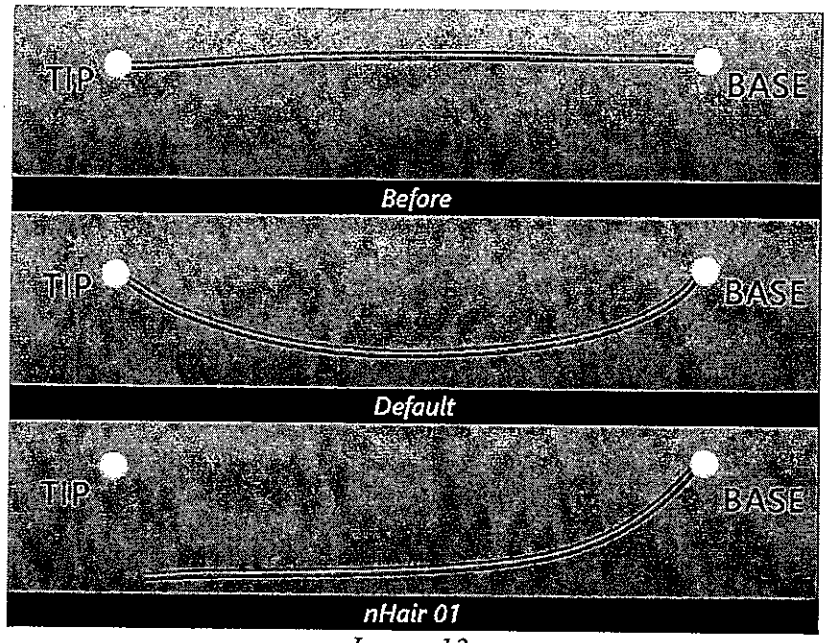


Image 13

26. *Image 13* is a simple dynamic curve using *n*Hair. Without any modifications, the dynamic curve will result similar to '*default*'. What would you need to modify to achieve the result reflected in *n*Hair *01* image?

    A. Set the *n*Hair point constraint strength to 0
    B. Set the point lock to 'Tip'
    C. Set the point lock to 'Base'
    D. Delete the tip's follicle vertices

27. Gary tried to create a complex dynamic simulation on his project. However during simulation, the viewport playback lags and stutters, resulting in an inaccurate simulation result. What can he do to rectify the situation and ensure that he has a proper simulation result?

    A. Ensure that the playback keyframe is set at Smooth interpolation
    B. Ensure that the viewport shading is set to wireframe shaded
    C. Ensure that the playback max speed is set at Real-Time
    D. Ensure that the playback speed is set to Play Every Frame

Last bit, I promise .....

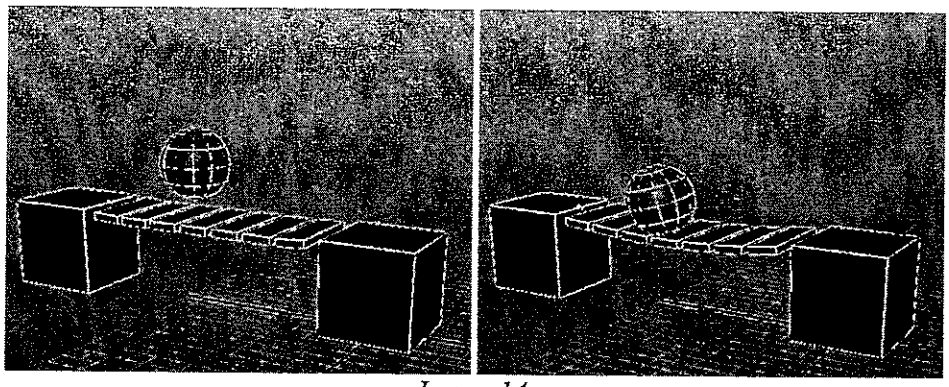


Image 14

28. *Image 14* displays a Rigid Body sphere falling on top of a rigid body bridge. Which type of Rigid Body constraints would allow the bridge planks to hold the ball similar to the image above?

    A. Hinge Constraint
    B. Nails Constraint
    C. Multi Constraint
    D. Pin Constraint

29. Dr Estranged has created a scene of a rigid body cube moving on the X-axis. He wanted the cube to continuously move without ever stopping. How can he achieve this using the dynamic systems available?

    A. Assign a value to the impulse attribute
    B. Assign a value to the initial velocity attribute
    C. Decrease the static friction attribute
    D. Decrease the conserve value

30. Which attribute below would you need to adjust in order to create a loose rope effect using *n*Hair?

    A. Increase the Stretch Resistance and Bend Resistance.
    B. Decrease the Stretch Resistance and Bend Resistance
    C. Increase the Stretch Resistance, Decrease the Bend Resistance
    D. Decrease the Stretch Resistance, Increase the Bend Resistance

The End. But wait .....

PART TWO: ESSAY QUESTIONS
Answer TWO of the following THREE Questions. Give DIRECT answers.

Question 1

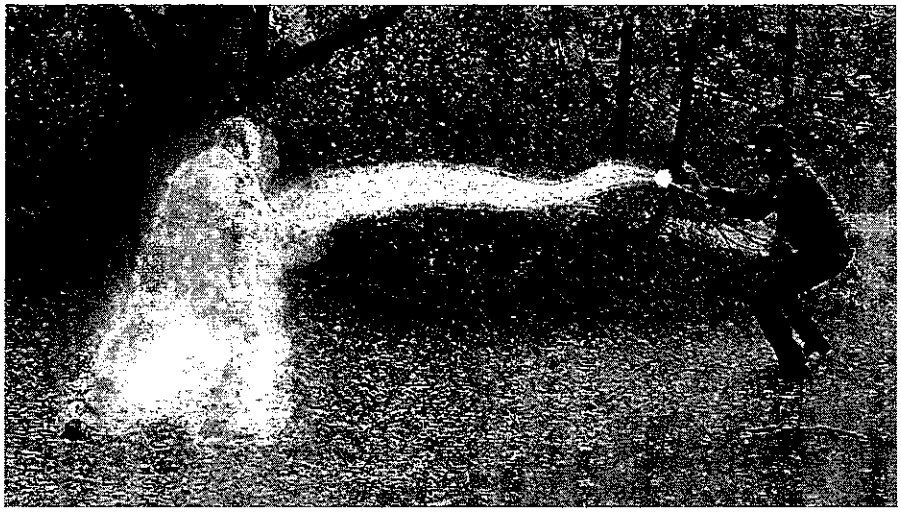


Image 15

I. *Image 15* above depicts a scene where the guy in black is casting a magical spell to extract the 'life-force' out of his opponent. The visual effect scene shows particles coming out from the opponent's body and flies into his wand (yes he is holding a wand in his right hand). Please **EXPLAIN** how this effect can be achieved using Maya *n*Particles system?

(16 marks)

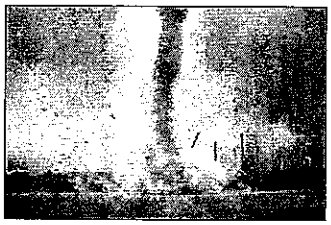
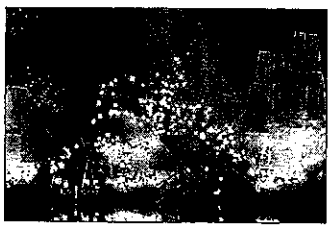
II. Explain what are the differences between a **SPRITE** particle as compared to a **CLOUD** particle used in both particle systems?

(*4 marks*)

Question 2

I. Please provide **THREE** productivity methods to improve efficiency in any dynamic simulation process. Discuss briefly the reasoning behind those methods? *(6 marks)*

II. F ill up the table below with the **BEST EFFICIENT** answers. Please recreate *Table 01* in your answer booklet and omit the first example from your answers.

Effects	Dynamics System used	Key technique(s) used
Wall break (example)	Rigid Body or Bullet Simulation *(example)*	Shatter tool, Active & Passive Body, Gravity field. *(example)*
Liquid Splash		
 *Realistic Tornado*		
 *1000 Flying Lanterns*		

Zombie cut in half		
Soft vapour		
Fire on character body		
Grains filling up a jar		

Table 01

(14 marks)

Question 3

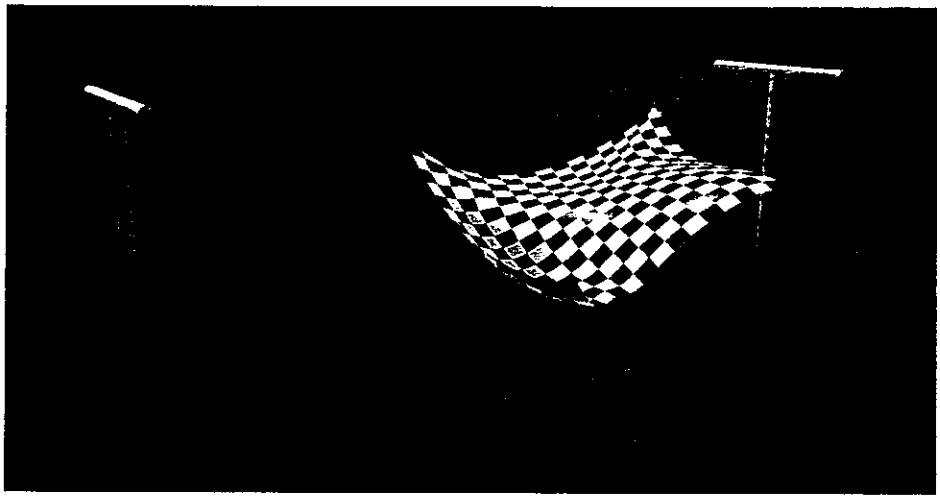


Image 13

I. *Image 13* above is scene combination of *n*Cloth and *n*Hair of a checkered blanket blowing in the wind. The blanket is attached onto the hanging rope with clips. Based on your understanding of *nDynamics*, how would you execute this effect step-by-step?

STEP 01: Model all the objects and ensure to delete all history.
STEP 02: ....
STEP X: ...
FINAL STEP: Simulate and cache the file for render.

(16 marks)

II. Continuing from the above scene, please explain how would you create the effects of the blanket tearing off from the clips? Explain **BRIEFLY** your methods and tools used for the effect.

(*4 marks*)

**Please check, re-check and triple-check your answers until the exam end.*
You may answer all 3 questions in PART TWO and the highest marks will be selected for final marks calculation.

End of Paper